

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Patent Application No. 10/015,565

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended) A small-sized stepping motor comprising:
 - a substantially cylindrical shaped rotor including a rotor magnet portion;
 - a rotary shaft inserted and fixed through ~~into~~ said rotor magnet portion, said rotary shaft including a narrow portion provided on an output side of said rotary shaft so as to be separated from the rotor magnet portion;
 - a stator opposed to said rotor, wherein the stator comprises two pairs of stacked stator cores, each stator core comprising an inner yoke and an outer yoke, and the inner and outer yokes being integrated by a coil bobbin;
 - an output side bearing provided on an output side face of one of the two pairs of stator cores of said stator ~~the output side of said rotary shaft~~, and supporting a portion near an output portion of said rotary shaft;
 - an opposite side bearing holding portion provided on an opposite side face of the other of the two pairs of stator cores of said stator for holding an opposite side bearing movable in an axial direction and supporting an opposite side of said rotary shaft ~~for holding an opposite side bearing supporting an opposite side to the output side of said rotary shaft; and~~

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Patent Application No. 10/015,565

an urging member held by the opposite side bearing holding portion for urging the opposite side bearing toward the output side so that the rotor and the rotary shaft are urged toward the output side; and

a resin washer fitted on around said narrow portion of said rotary shaft and pushed by the urging member via the narrow portion of said rotary shaft to be brought into contact with the output side bearing to thereby be positioned in the axial direction of the rotary shaft;

wherein said stator cores are integrally formed with the coil bobbin by insert molding, and said output side bearing, the coil bobbin and the opposite side bearing holding portion are made of the same resin and integrally formed with each other, whereby the output side bearing and the opposite side bearing holding portion are integrated ~~with the stator cores through the coil bobbin with the same resin;~~

wherein a lead screw is formed at the output portion protruded from the output side bearing and a rotation of said lead screw directly affects moves an operated member; and

~~wherein the opposite side bearing supported by the opposite side bearing holding portion is configured to be movable in an axial direction thereof while being urged toward the output side so that the rotor and the rotary shaft are urged toward the output side and the resin washer is brought into contact with the output side bearing to thereby be positioned in the axial direction thereof.~~

2. Canceled.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Patent Application No. 10/015,565

3. (Original) A motor according to Claim 1, wherein a hole having an inner diameter larger than an outer diameter of said rotor is formed in said opposite side bearing holding portion.

4. (Original) A motor according to Claim 3, wherein said opposite side bearing is constituted by an axially movable slide bearing, which is disposed in said hole and urged toward the output portion side; and an end of said rotary shaft is supported by said opposite side bearing.

5. (Previously Presented) A small-sized stepping motor comprising:
a substantially cylindrical shaped rotor including a rotor magnet portion;
a rotary shaft inserted and fixed through ~~into~~ said rotor magnet portion, said rotary shaft including a narrow portion provided on an output side of said rotary shaft so as to be separated from the rotor magnet portion;
a stator opposed to said rotor, wherein the stator comprises two pairs of stacked stator cores, each stator core comprising an inner yoke and an outer yoke, and the inner and outer yokes being integrated by a coil bobbin;
an output side bearing provided on an output side face of one of the two pairs of stator cores of said stator ~~the output side of said rotary shaft~~, and supporting a portion near an output portion;

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Patent Application No. 10/015,565

an opposite side bearing holding portion provided on an opposite side face of the other of the two pairs of stator cores of said stator for holding an opposite side bearing movable in an axial direction and supporting an opposite side of said rotary shaft;

an urging member held by the opposite side bearing holding portion for urging the opposite side bearing toward the output side so that the rotor and the rotary shaft are urged toward the output side; and

a resin washer fitted on around said narrow portion of said rotary shaft and pushed by the urging member via the narrow portion of said rotary shaft to be brought into contact with the output side bearing to thereby be positioned in the axial direction of the rotary shaft;

wherein said stator cores are integrally formed with the coil bobbin by insert molding, and said output side bearing, the coil bobbin and the opposite side bearing holding portion are made of ~~a~~the same resin, and integrally formed with each other, whereby the output side bearing and the opposite side bearing holding portion are integrated with the stator cores ~~with the stator cores through the coil bobbin with the same resin~~; and

wherein a lead screw is formed on said rotary shaft from said output portion of said rotary shaft to a portion which is opposed to an inner surface of said output side bearing; and

wherein lubricant is filled in a gap formed between said lead screw and said output side bearing; and

~~wherein the opposite side bearing supported by the opposite side bearing holding portion is configured to be movable in an axial direction thereof while being urged toward the output side so that the rotor and the rotary shaft are urged toward the output side and the resin washer is~~

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Patent Application No. 10/015,565

~~brought into contact with the output side bearing to thereby be positioned in the axial direction thereof.~~